

# Graphene Nanocomposite Cathode for Advanced Space Battery, Phase I

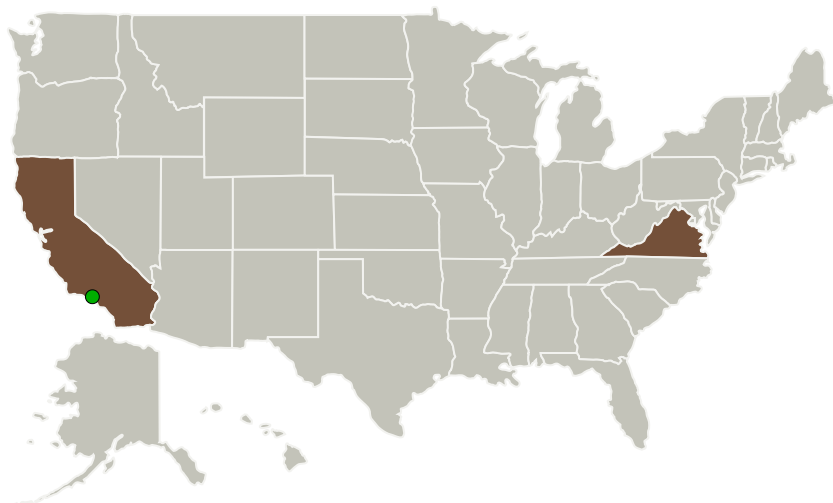
Completed Technology Project (2012 - 2012)



## Project Introduction

High efficiency power systems are needed for NASA's future human exploration of space and such power systems must have advanced safety feature and provide high specific energy and high volumetric energy density. Luna Innovations propose to develop novel rechargeable battery with advanced non-toxic and safe anode and cathode materials. Aggressive weight and volume performance improvements over state-of-the-art lithium-ion batteries will be achieved for use in NASA's size-sensitive space vehicles. The proposed graphene nanocomposite-based cathode can be used in coupling with advanced silicon anodes that are much safer compared to lithium metal anodes used in conventional Li-ion batteries. The new battery technology incorporates novel graphene/nanosheet composite in the cathode design to provide higher efficiency for active material utilization and improved reversibility in the electrochemical reactions thus to provide higher energy density and greater cycling stability. We anticipate that the new rechargeable battery will meet all of the metric goals including safety, stability, cycle life and power that specified by NASA for its human-rated space applications.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Luna Innovations, Inc.	Lead Organization	Industry	Roanoke, Virginia
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Virginia

## Project Transitions

**February 2012:** Project Start**August 2012:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/138187>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Luna Innovations, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

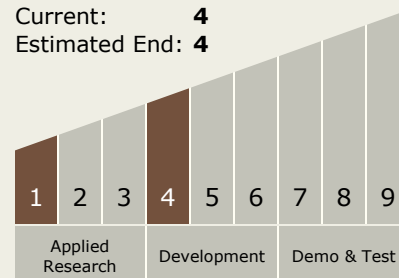
Carlos Torrez

**Principal Investigator:**

Zhiguo Zhou

## Technology Maturity (TRL)

Start: **1**  
 Current: **4**  
 Estimated End: **4**



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## Technology Areas

### Primary:

- TX03 Aerospace Power and Energy Storage
  - └ TX03.2 Energy Storage
    - └ TX03.2.1 Electrochemical: Batteries

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System